

# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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December 20, 2011

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen, Environmental Scientist III *SC*

RE: Change to Appendix 7-65, Genwal Resources, Inc., Crandall Canyon, C/015/0032, Task ID #3941

### **SUMMARY:**

On October 21<sup>st</sup>, 2011, the Division of Oil, Gas and Mining (the Division) received a permit amendment from Genwal Resources Inc. (Genwal or the Permittee) with changes to Appendix 7-65 of the Crandall Canyon Mining and Reclamation Plan (MRP). This amendment was submitted to satisfy the abatement requirements for NOV 10073, issued to Genwal on February 16, 2011. The previous task associated with this amendment was Task ID #3827 which was returned to the Permittee on August 3<sup>rd</sup>, 2011. The reasons why NOV 10073 was issued is:

*The Permittee failed to comply with the terms and conditions of the approved Crandall Canyon Mining and Reclamation Plan (MRP). Commitments to provide summary/chronology information and operational costs associated with the mine-water treatment system at the Crandall Canyon Mine were not fulfilled. The information was not submitted for inclusion into the MRP within established deadlines.*

The abatement actions for NOV 10073 are as follows:

- *Submit the summary/chronology information of the mine-water treatment system (as outlined on page 11 of Appendix 7-65) for inclusion into the Crandall Canyon MRP by March 16th, 2011. The submission must address outstanding deficiencies (listed for Experimental Treatment Design Information) identified in the February 16th, 2011 deficiency letter for Task ID #3714 and #3724 and be submitted under a notarized CI/C2 form.*
- *Submit an up to date summary of equipment costs and projected annual operations/maintenance costs for the current mine-water treatment system (as outlined*

*on page 11 of Appendix 7-65) for inclusion into the Crandall Canyon MRP by March 16th, 2011. The cost information must be submitted in the example format provided (See Attached). Additionally, the cost information must address outstanding deficiencies (relative to the mine-water treatment system costs) identified in the February 16th, 2011 deficiency letter for Task ID #3714 and #3724 and be submitted under a notarized C1/C2 form.*

The permit amendment received on October 21<sup>st</sup>, 2011 does not satisfy the abatement actions for NOV 10073. The previous amendment (Task ID #3827) had contained the annual operating cost information relative to the mine-water treatment system for consideration/review for inclusion into the approved MRP. However, the cost information was not submitted with this amendment. The issue of cost and bonding associated with the mine-water treatment system is currently under review by the Board of the Division of Oil, Gas and Mining (the Board). Once the Board renders a decision as to how the bonding/cost issue relative to the mine-water treatment system is to be handled, NOV #10073 will be handled accordingly.

The previously identified deficiencies (not associated with cost) have been addressed with this amendment. However, since the cost information has not been submitted for review, NOV #10073 remains outstanding. Additionally, other deficiencies have been identified with the proposed revisions to Appendix 7-65 that are not associated with NOV #10073.

The following deficiencies have been identified as outstanding and must be addressed:

**R645-301-731:** The Permittee must revise the Chapter 7 List of Plates table of contents to show that Plate 7-13, *Potentiometric Surface Spring Canyon Member Star Point Sandstone* is not to be deleted. It's unclear why the plate was marked for deletion given that no explanation was provided for doing so.

**R645-301-731.200-** The Permittee must revise the ledge seep water flow discussion on page 7-41 to indicate that the monthly flow measurements will be submitted to the Division via the electronic water monitoring database and not via e-mail. The highwall seep flows have been submitted to the Division electronically (via the electronic database) since April of 2010. The practice of submitting the data electronically should continue.

**R645-301-742.220:** The Permittee must maintain the approved language located in the last sentence of the 3<sup>rd</sup> paragraph on page 14 (Temporary Use of Crandall Sediment Pond section). The approved MRP identifies an end date of October 30<sup>th</sup>, 2010 for utilization of the Crandall sediment pond during clean-out operations of the mine-water treatment basin.

**R645-301-, 123 and -830:** The Permittee must submit the projected annual operating cost information for the mine-water treatment system under notarized signature. Any change to

the approved MRP must be submitted under the notarized signature of a responsible official of the applicant. In the absence of the signature, an application can not be considered for inclusion/incorporation into the approved MRP.

## **TECHNICAL ANALYSIS:**

# **ENVIRONMENTAL RESOURCE INFORMATION**

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

## **MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

### **Analysis:**

#### **Subsurface Water Resource Maps**

The amendment does not meet the Subsurface Water Resource Map requirements of the State of Utah R645-Coal Mining Rules.

The table of contents for Chapter 7 plates was provided with the amendment. Plate 7-13, *Potentiometric Surface Spring Canyon Member Star Point Sandstone*, was marked for deletion. It's unclear why the Permittee has marked this plate for deletion. No explanation was provided as to why this plate should be deleted from the approved MRP. The Permittee must revise the Chapter 7, List of Plates Table of Contents to show that Plate 7-13, *Potentiometric Surface Spring Canyon Member Star Point Sandstone* is not to be deleted.

### **Findings:**

The information submitted does not meet the Subsurface Water Resource Map requirements of the State of Utah R645-Coal Mining Rules. The following deficiency must be addressed:

**R645-301-731:** The Permittee must revise the Chapter 7 List of Plates table of contents to show that Plate 7-13, *Potentiometric Surface Spring Canyon Member Star Point Sandstone* is not to be deleted. It's unclear why the plate was marked for deletion given that no explanation was provided for doing so.

## **OPERATION PLAN**

### **HYDROLOGIC INFORMATION**

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

#### **Analysis:**

##### **Other Treatment Facilities**

The Division identified by letter on February 16, 2011 numerous deficiencies associated with the amendment to MRP Appendix 7-65 received by the Division on December 14, 2010 and reviewed under Task ID No. 3714. The letter directed the Permittee to respond to the deficiencies not associated with the Probable Hydrologic Consequences (PHC) revision (Task ID No. 3724). The amendment received on May 26, 2011 as well as the amendment currently under review did not address the summary/chronology commitments established on page 11 of Appendix 7-65. The outstanding items were as follows:

A summary/chronology of the experimental process that led to the final design including:

A summary of the various treatment methods that were examined/tested.

A discussion as to the chemical additives that were employed during the trial and error process. The discussion shall include the ratios of chemicals that were utilized in the various test configurations as well as the corresponding water quality results.

An up to date tabulation of the mine-water flow data that was been collected since the installation of the AVF Flow Meter.

The field data and lab analytical results that were obtained during the various test configurations/water treatment approaches that were explored.

Based upon numerous conversations with the Permittee, detailed information/notes were not kept during the construction of the treatment basin. The treatment system was primarily the result of trial and error based on recommendations from company personnel in the eastern United States. As a result of the trial and error nature of the current treatment system configuration, detailed design information/considerations are not available.

In addition to the summary/chronology information discussed above, the Permittee was directed to provide experimental treatment design information. A deficiency was identified

relative to this information in the February 16<sup>th</sup>, 2011 Division letter to the Permittee as well as subsequent technical reviews. The requested information included the following:

Treatment Technology Screening

- Consultant reports and descriptions for technology screening, if any, prior to selection of oxidizer unit
- Oxidizer(Maelstrom) unit bench testing information
- Consultant reports from the three Geotube companies and one press company to which sludge samples were sent July 2010
- Consultant reports describing successful "Geobag" testing completed October 2010, including Geobag specifications, operating conditions, concentrations and types of additional treatment chemicals employed.
- Consultant report(s) for cyclone testing completed 11/5/2010 (type of cyclone and operation settings)

Chemical Additives

- Concentrations of treatment chemicals used:
  - 2/24/2010 - Sodium Hydroxide (NaOH)
  - 2/25/2010 - Nalco 7763 plus NaOH
  - 3/15-16/2010 - Nalco 7763 and Nalco 7888 (8187)
  - 3/19/2010 - Nalco 8158
  - 3/25/2010 - NeoSolutions 18100
  - 4/16/2010 - Nalco 8187
  - 10/20/2010 - Solve 151
- Consultant reports and analytical results for polymer testing results from Nalco and WaterSolve.

Field Data and Lab Analytical Results

- Field measurements (sludge settling times, field-measured iron concentrations, turbidity measurements, etc.) used to evaluate treatment effectiveness
- Laboratory analytical results for samples analyzed to evaluate treatment effectiveness

Mine-water Flow Data

- Date that the flow meter used for Outfall 002 was first suspected or known to be malfunctioning.

Sludge Disposal

- Volume sludge sent to Crandall Sediment pond between July 19 and August 23, 2010
- Specific dates and volume of sludge sent to Crandall sediment pond November 2010.

As with the summary/chronology information discussed above, the Permittee is unable to

provide the information as it was not collected in sufficient detail.

The Permittee was directed to revise the amendment to identify: the concentration of flocculant prepared in the make-down unit; and the sludge recirculation rate being used under current operating conditions. Beginning on page 4 of Appendix 7-65, the Permittee discusses the make-down unit and sludge recirculation process. The Permittee indicates that "*Presently (October, 2011), the flocculant is being prepared in the make-down unit at a concentration of 0.25%*". Additionally, the Permittee indicates on page 5 of Appendix 7-65 that the sludge recirculation rate is approximately 500 gallons per minute (gpm).

A previously identified deficiency directed the Permittee to provide a commitment that only treatment chemicals certified under NSF60 will be utilized for the mine water treatment system, and that monitoring will be conducted for Genwal will monitor the dosage rate (in mg/L) for all treatment chemicals used. On page of Appendix 7-65, the Permittee commits to only utilizing "*treatment chemicals certified under NSF60*" and that "*the company will monitor the dosage rates (in mg/L) for all treatment chemicals used*". Additionally, the Permittee states, "*The company will monitor treated water for carryover of treatment chemicals on a monthly basis or when dosage rates or chemical produces are changed. Dosage rates will not exceed the NSF60 certified concentrations without a prior demonstration to the Division, Forest Service and DWQ that elevated dosage rates are acceptable based on analytical results for treated water samples*".

The previous technical analyses of Appendix 7-65 revisions had identified a deficiency relative to the cleanout operations of the iron sludge treatment basin. The Permittee was also directed to provide criteria to be utilized in determining when the sludge needed to be removed from the treatment basin. On page 7 of Appendix 7-65, the Permittee indicates that the cleanout operations of the treatment basin are conducted on an "*as needed basis*". The amendment indicates that, based on historical experience to date, the basin "*may require regular cleanout approximately once every several months*". Based upon observations by Division staff, clean-out operations have historically been conducted every other month and been conducted on the entire pond (i.e. a thorough clean-out of the entire treatment basin). In recent months, the Permittee has indicated that clean-out operations were being focused primarily on the 2<sup>nd</sup> and 3<sup>rd</sup> cells of the pond and being conducted for approximately 6-7 hours a day every day.

On page 14 of the amendment, the Permittee has revised the language in the Temporary Use of Crandall Sediment Pond section. The Permittee has removed the October 30<sup>th</sup>, 2010 end date for use of the Crandall sediment pond for treatment basin cleaning and replaced it with "*as authorized by the Division*". The Permittee must retain the approved language located in the last sentence of the 3<sup>rd</sup> paragraph on page 14 (Temporary Use of Crandall Sediment Pond section). The approved MRP identifies an end date of October 30<sup>th</sup>, 2010 for utilization of the Crandall sediment pond during clean-out operations of the mine-water treatment basin. The language was established in July of 2010 to allow for experimentation of various sludge clean-out techniques. Since October 30<sup>th</sup>, 2010, the Division has allowed the routing of treated mine-water sludge to be

routed to the primary sediment pond with the understanding that a permanent storage location/facility was in the process of being permitted on nearby SITLA land. On at least three different occasions, the Division has allowed utilization of the primary sediment pond for sludge disposal on a case-by-case basis.

On June 13<sup>th</sup>, 2011, the Permittee submitted a request (via e-mail) to utilize the primary sediment pond for iron sludge disposal. The Permittee indicated that the request was a *"temporary permission situation"* and that submission of a permanent storage facility application would be submitted by the end of June 2011. To date, the Division has not received the application.

In addition, the Division has recently learned that clean-out operations and the routing of treated mine-water sludge from the treatment basin to the primary sediment pond has been occurring on an almost daily basis. On page 5 of Appendix 7-65, the approved MRP explicitly states, *"Prior to initiating any cleaning of the basin, the company will provide a minimum of 24-hour notice to the Division"*. In violation of the approved MRP, this provision has not been adhered to.

As a result, continued utilization of the primary sediment pond for purposes of storing the mine-water treatment sludge is no longer authorized by the Division. Any use of the primary sediment pond, other than its designed purpose of sediment control/storm-water runoff, will result in enforcement action.

The previous technical analyses identified a deficiency relative to descriptions of the water treatment system as a *"mechanically simple system"*. The Permittee was directed to remove such references given the sheer number of components of the mine water treatment system. In addition, the Permittee was to provide a description/demonstration that necessary repairs to the mine-water treatment system could be accomplished within an 8-hour window. On page 9 of the amendment, the Permittee discusses the various redundancies and extra components on site. The Permittee indicates that spare pumps, a spare make-down unit and a back up flow meter are on the site. In addition, the system is monitored continuously by a computer interface. The computer system provides off-site monitoring capability and allows for company personnel to keep apprised of system operations in real time in a remote location.

The Permittee was directed to remove the discussion of ongoing baseline water monitoring associated with the mine water discharge and groundwater seepage from the highwall face section and place that discussion in Section 7.31.2 of the approved MRP. The Permittee has revised pages 7-40 and 7-41 to reflect the monthly monitoring of the mine discharge (Pre-002) as well as the ledge seep water flow. However, the Permittee indicates that the monthly flow measurements obtained from the ledge seep water will be reported to the Division via e-mail. The data is currently being provided electronically into the Division's Water Monitoring Database. The Permittee must revise the ledge seep water flow discussion on page 7-41 to



indicate that the monthly flow measurements will be submitted to the Division via the electronic water monitoring database. The highwall seep flows have been submitted to the Division electronically (via the database) since April of 2010. The practice of submitting the data electronically should continue.

The previous technical analysis directed the Permittee to update Attachment 8, Construction Specifications and Drawings, to accurately reflect the installation of all aspects of the water treatment system. Additionally, the Permittee was directed to revise the *Iron Treatment Facility As-Built Plan* to accurately reflect the current conditions of the mine-water treatment facility. On page 3 of Appendix 7-65, the Permittee provides a detailed discussion of the current configuration of the mine-water treatment system. Additionally, the figures in Attachment 8 (Iron Treatment Facility, As-Built Plan and Mine-Water Treatment As-Built Flow Diagram) have been revised to accurately reflect the current configuration of the mine-water treatment system.

#### **Findings:**

The information submitted does not meet the Hydrological Information requirements of the Utah R645 Coal Mining Rules.

**R645-301-731.200-** The Permittee must revise the ledge seep water flow discussion on page 7-41 to indicate that the monthly flow measurements will be submitted to the Division via the electronic water monitoring database and not via e-mail. The highwall seep flows have been submitted to the Division electronically (via the electronic database) since April of 2010. The practice of submitting the data electronically should continue.

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## **RECLAMATION PLAN**

### **BONDING AND INSURANCE REQUIREMENTS**

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

#### **Analysis:**

##### **Determination of Bond Amount**

The abatement actions for NOV 10073 included the submission of equipment costs and projected annual operations/maintenance costs for the current mine-water treatment system for inclusion into the Crandall Canyon MRP. The cost information was required to include the following line items:

- Equipment costs (capital)
- Chemical costs (annual)
- Sludge cleanout, transportation, and disposal costs (annual)
- Electricity, propane and water costs (annual)
- Operational Labor (annual)
- Maintenance Labor (annual)

In the May 26, 2011 submittal (Task ID #3827), Genwal provided cost information for equipment, operations (including treatment chemicals and facilities) and maintenance (including sludge cleanout and disposal). The cost information was submitted under a notarized signature which is required in order for the Division to consider it's incorporation into the approved MRP.

Although the Division identified several areas that required reconciliation, the submittal of the cost information met the abatement requirement for NOV #10073. However, due to other deficiencies identified during that technical analysis (Task ID # 3827), the cost information was never approved. The current amendment did not contain the cost information as the question of annual operating costs/bonding of the mine-water treatment facility is currently under review by the Board of the Utah Division of Oil, Gas and Mining. As a result, NOV #10073 remains outstanding.

#### **Findings:**

The amendment does not meet the Determination of Bond Amount requirements of the State of Utah R645-Coal Mining Rules.

**R645-301-, 123 and -830:** The Permittee must submit the projected annual operating cost information for the mine-water treatment system under notarized signature. Any change to the approved MRP must be submitted under the notarized signature of a responsible official of the applicant. In the absence of the signature, an application can not be considered for inclusion/incorporation into the approved MRP.

#### **RECOMMENDATIONS:**

The amendment is not recommended for approval at this time.